

Colorado Department of Health

Comments

FINAL WORK PLAN

PHASE I RFI/RI WORK PLAN

ROCKY FLATS PLANT

WEST SPRAY FIELD

(Operable Unit No. 11)

DECEMBER 18, 1991

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Executive Summary: The discussion under the heading "SOIL", page 2, is vague. The proposed radiation survey includes a proposal* for soil samples to verify the survey and to test for non-gamma emitting radionuclides; therefore, reference to radionuclide sampling should be clearly stated. A separate surficial soil sampling program is proposed to test for metals, inorganics and nitrates exclusive of radionuclides. (* The proposal to conduct radionuclide sampling is a weak and inconsistent commitment which the Division's comments are aimed at strengthening.)

Section 1.2: Please note a typographical error, references are in Section 12 rather than Section 2.

Section 1.3.3.2: The last sentence of this section is somewhat misleading and does not adequately disclose why the Laramie Formation is at a "shallow" depth beneath the West Spray Field. If "shallow dip" is a term equivalent to a low angle of dip, the Laramie Formation would be deeper and the Arapahoe Formation might still be present. The planation of moderately dipping strata, progressively older from east to west, is what suggests a "potentially shallow depth" for the Laramie Formation, and complete erosion of the Arapahoe Formation, at the West Spray Field. The dissection of the alluvial surface by streams merely increases the potential for a shallow Laramie Formation on the west side of RFP. This, or a comparable discussion, should be added to Section 2.2.4.1, Bedrock, and the last sentence of this section should be

modified. Both changes would provide a clearer understanding of site-specific conditions and promote a better RFI/RI Report and better Phase II investigation.

Section 2.2.1.2: The first paragraph of this section states that irrigation lines are shown on Figure 2-1. The irrigation areas are shown but the lines are not shown. Should Figure 2-8 have been referenced rather than Figure 2-1? Figure 2-1 and the irrigation lines are also linked in the third paragraph of page 6. Please note that the irrigation lines are not referenced in the legend of Figure 2-8. Please correct.

Section 2.3.2.4: Under the sub-heading Radionuclides, last paragraph, page 27, it is stated that above background levels of plutonium were reported but the specific source was "unknown" since applied wastewaters have not indicated the presence of plutonium. DOE should consider the potential, if not probability, that undetectable levels of plutonium in wastewater have been concentrated to above background levels through evaporation of the spray water. (Please note, the first paragraph of Section 9.2.1.1 acknowledges this potential for concentration of contaminants through evaporation.)

Section 2.3.2.5: In the first paragraph, page 30, it is stated that "Confirmatory sampling" at depths greater than five feet, e.g. boreholes, will be needed if contamination is found in the shallow soils. Since the procedure for sampling in the test pits will be to sample the upper six inches of the A, B and C soil horizons, respectively, does this mean that contamination in any soil horizon will trigger drilling or must contamination have penetrated to the C soil horizon? This issue must be addressed in an appropriate section of the FSP.

Section 2.3.3.4: The third paragraph, page 34, states that radionuclides have been detected in alluvial wells along the perimeter of the West Spray Field. Section 2.3.2.5 states that borings would be advanced to the maximum depth of the vadose zone, e.g. to groundwater, if contamination is found in the shallow soils. With radionuclides already known to be present in ground water, it would appear that borings are already justified. However, the Division sees some utility in using test pits to rationally plan the locations of borings as a Phase I step.

Figure 2-10: The Site Conceptual Model flow chart includes a vertical line between the Primary Release Mechanism and the Transport Media columns that is not connected to any component of the chart. It appears that it should be removed.

An additional box should be added beneath Deposition/Precipitation and should state: Re-suspension/Dissolution. Arrows should then be drawn from the Deposition/Precipitation box to the new box, and from there, back to Surface Water. Re-suspension or dissolution of

previously precipitated or deposited contaminants can re-mobilize contaminants downstream.

Vadose Water (not zone) may not always finds its way into ground water. The model needs to allow for the movement of vadose water, and potential contaminants, back into contaminated soils and sediments, and into previously uncontaminated soils and sediments, through the release mechanisms of Infiltration/Percolation and Seepage.

Section 3.0: The Division will withhold comments to this section until such time as the site-wide chemical specific potential ARAR issues have been resolved. The Division reserves the right to comment on this section at that time.

Section 4.1.2.2: What additional data are needed to characterize the hydrological conditions for development of the site conceptual model? Not enough information is conveyed to allow the Division to determine what is needed, whether it is addressed by the FSP, or whether it is a Phase II issue. Please clarify each of these uncertainties.

Section 4.1.4: The last sentence, first paragraph of this section states that RFI/RI objectives "are summarized in Table 4-1 and are discussed below". In comparing the table to the text, the portions devoted to characterization of site physical features are inconsistent. Table 4-1 limits site characterization to defining the bedrock surface and alluvial channels, while the list on page 7 lists five completely different objectives. The objectives list in Section 7.1, page 3, are comparable, but less specific, than those in Section 4.1.4. By summarizing the five additional objectives in Table 4-1, the Data Needs, Activities, etc, may be clearly stated. For example, if "Determine permeability of subsurface materials" is an objective, what data are needed and what activities are proposed to meet that need? DOE needs to be consistent and very specific as to it objectives, data needs, and proposed activities, etc.

The Division offers the following additional observations to the lists on page 7:

- o Plate 2-1, of the June 1990 Draft RFI/RI Work Plan shows seven (7) irrigation lines within, and to the east, of Spray Area 1. The Division's comment to Section 2.2.1 of the draft document have not been acknowledged and only three lines are referenced in this work plan. DOE should acknowledge this issue, specifically, and look for seven locations, not three, within the vicinity of Spray Area 1. Furthermore, the northeast-southwest oriented irrigation line between Spray Area 2 and the raw water storage pond needs to be investigated (See Plate 2-1 of the draft work plan.)

- o Since caliche stringers were reported in only one previous test pit, WSF-06, will the pits be of a depth sufficient to identify caliche beds. Is DOE proposing to rely on previous borehole data and data from the site-wide drilling program? Please clarify.
- o The Division is unclear how permeability of subsurface materials will be determined. Will this be associated with the test pits? If so, please specify how and specify the applicable EMD.OP.
- o An activity to determine background concentrations in surface and subsurface soils has not been established in the FSP. What is DOE's plan? The collection of WSF site-specific background data appears to be in conflict with the intent of the site wide Background Geochemical Characterization Report. The Division would welcome additional viable data but still expect that what constitutes background would be determined through the Background Geochemical Characterization Report, and the applicable statistical methods, to ensure sitewide consistency of closure/remediation goals.

Section 4.3: The last paragraph of this section, page 16, states that no SOPAs are required for this work plan. It appears that a SOPA (or is it a EMD.OPA ?) may be needed to cover the collection of pore water samples from the test pits.

Table 4-1: Under "Characterize Site Physical Features" current data and data from site wide drilling activities may not be sufficient to allow detailed mapping of the bedrock surface. It is further unlikely that subsurface alluvial channels can be delineated. If bore holes become necessary, they may have to serve the dual purpose of contaminant identification and delineation and bedrock/channel mapping. DOE must specify how this objective will be met with currently available data.

Background samples, although discussed on page 7 of Section 4, are not evident in the table. (Furthermore, the FSP does not provide specifically for background samples.)

Section 5.3.3: Section 7, second paragraph, page 6, indicates that the purpose for the "soil sample locations", as the phrase is used in this section, is to determine the presence or absence of non-gamma emitting radionuclides. That same purpose should be stated in this section to clarify the rationale for this portion of the investigation. This is important considering that the soil samples discussed in Section 5.3.4 are not to be analyzed for radionuclides and sampling procedures are different for radionuclide versus non-radionuclide samples.

Section 5.5.2: A first use for the data is:

- o Determine need for, and locations of, vadose zone boreholes.

Please add this item to the list.

It is stated in the last paragraph that, to identify contamination, data will be compared to site wide background values provided in the background report. How, specifically, will this data be compared? Is a comprehensive statistical treatment planned or will simple statistical tests be utilized to determine incidence of contamination sufficient to plan drilling activities. Although the Division expects and encourages a properly designed borehole plan, delays in the submission of the Phase I RFI/RI Report resulting from a drawn-out decision process will not be acceptable.

Section 7.1: The objectives for "Characterize Site Physical Features" listed in Section 4.1.4 includes a proposal to determine the past locations of irrigation lines. The objective must be included in the FSP or it may be overlooked during the investigation. This is especially true since the June 1990 version of the work plan, Plate 2-1, showed seven irrigation lines versus the three shown in this work plan.

Regarding the "Define Contaminant Sources" list, it is appropriate to further expound on the proposed activities, however, the objectives need to be consistent. For example, in item 4, soils should be changed to read "sediment". This appears to be trivial, however, the sediment sampling program being proposed uses different EMD.OPs than does a soil sampling program. Also, the reference to determination of human and biotic receptors is absent from this list of activities. If this is an human risk assessment/ environmental evaluation activity addressed in Sections 8.0 and 9.0, please refer to those sections rather than have the Division wonder if the task was overlooked.

Section 7.2: Regarding the fourth paragraph, page 7, why would results of the radiation survey be used to modify the sample grid locations for surficial sampling when radionuclides are not an analysis parameter of these soil samples? Is DOE assuming that higher radionuclide levels equate to higher levels of other contaminants? If radionuclides are proposed as an indicator of contamination, please so state.

Section 7.3: As previously noted, item 3, page 9 should refer to sediment sampling, not soil sampling, since different EMD.OPs apply.

Section 7.3.1: Regarding the first paragraph of this section:

- o it states, "Wastewaters may have contained low concentrations of radionuclides which may have been deposited by the spraying." This would be an appropriate place for DOE to acknowledge that "solar evaporation" may have concentrated contaminants.
- o DOE states that soil samples "may" potentially augment the germanium survey. However, in the second paragraph of page 6, DOE states that soil samples "will be collected" to determine the presence or absence of non-gamma emitting radionuclides. The Division believes that soil samples should be taken to verify the germanium survey for gamma emitters and to investigate non-gamma radionuclides. Hopefully, both purposes can be accomplished with the same suite of samples.

Regarding the second paragraph of this section, the Division agrees to accept, review and approve, subject to comment, a CDRR which will explain sample locations and rationale for a HPGe survey based on computer modeling.

Regarding the third paragraph, page 11:

- o DOE should propose, in the same CDRR, a quantity of soil samples proportionally consistent with the number of soil samples used to confirm results of the previously completed aerial radiation survey. Sampling should not be limited to hot-spots but should be designed to confirm or refute false positives and false negatives and to check for non-gamma emitting radionuclides.
- o Since these are radionuclide samples, EMD.OP, GT.8 provides three sample collection methods. They are the CDH, the Jig & Scoop (RF method) and the Stainless Steel Scoop (Grab Sample). Vertical profile sampling is not defined in GT.8 and the Division is uncertain whether the grab sample being proposed is the same method since GT.8 is not referenced. EMD.OP, GT.8 specifies that the CDH method will be used on IAG projects; however, the Division desires to see a rationale for which method or methods are appropriate. Verification of HPGe survey results may warrant a shallow method; while infiltration of contaminants may warrant the "vertical profile" approach. If the CDH method is appropriate, please recognize that it provides for a sample depth of 1/4 inch (See following discussion).

Under Surficial Sampling, fourth paragraph, page 13, the CDH soil sampling method is specifically applicable to radionuclide soil samples. Since these soil samples are not intended to provide

radionuclide data, (See Section 5.3.4), the CDH method is not directly applicable. The fourth paragraph further states that samples will be taken to a 1" depth, the CDH method specifies a 1/4 inch depth. EMD.OP GT.8, (Section 6.0), discusses procedures for non-radionuclide surface soil sampling. Please determine which method is appropriate or propose a more suitable method. If a new method is proposed, please provide a EMD.OP Addendum.

Section 7.3.2: The second paragraph, page 15, discusses test pit excavation. Figure 7-2 indicates that Pore Water Samples will be collected from selected pits. The text should discuss pore water sampling in detail and include the procedures, or EMD.OP, to be utilized or developed.

Section 7.3.3: The first paragraph of this section discusses breached berms. Although these berms are shown on Plate 2-1, they should be included on Figure 2-8 for completeness. The Division also wishes to discuss the merits of moving one of the proposed sediment sample points of Figure 7-2 to the upstream side of the first berm. Although this may be a Phase II activity, the Division notes that one proposed sediment sample site is located outside the OU boundary.

Section 7.4.2: In the first paragraph, page 18, Table 7-3, not Table 7-2 contains CLP detection/quantitation limits.

Table 7-1: Under the column "Estimated No. of Data Collection Points", 48 is a misleading number. Perhaps 16 points, 3 samples per point, is a better way to state the objective. Investigating the level of contamination at 48 points gives the false impression that the investigation is more intensive than it actually will be.

Under the column "Conceptual Model Pathway Address(d)", vadose water is the appropriate term just as ground water is an appropriate term. The zone will not carry contaminants, but vadose water may. The term vadose water is used and defined in geologic dictionaries.

Table 7-2: Regarding the Spray Application Area 1, east section, Test Pit Location 1, the Location Rationale appears to be incorrect. Characterization of the west end of the pipeline is incorrect, but the pit would characterize the surface water drainage. Likewise, Test Pit Location 3 will not characterize the west end of a surface water drainage channel, or any drainage channel, per Figure 7-2. Regarding Spray Application 3, the Location Rationale is situated to characterize the east end, not west end, of the spray area.

Figure 7-2: There is great confusion, and shortcomings, regarding the proposed sediment sampling program. Section 7.3.3 states that thirty-three (33) sediment sampling sites are shown on Figure 7-2; however, Table 7-1 proposes only sixteen (16) sites. Moreover, a

review of the figure shows eighteen (18) sites, not thirty-three (33) or sixteen (16) sites.

The figure also shows sixteen (16) "Test Pits and "Test Pits with Pore Water Samples" sites for a total of thirty-four (34) individual sites, not thirty-three (33).

These problems are further compounded because sediment samples will consist of one-foot composite intervals (Section 7.3.3) while test pits will provide "a composite sample over the upper most six inches of each soil horizon (Section 7.3.2, page 15).

Figure 7-2 clearly shows several proposed test pits in stream drainages where it would be more appropriate to collect one-foot composite samples and less appropriate to collect soil horizon samples. Furthermore, of the eighteen (18) sediment sites, six (6) of these sites do not appear to be "along surface water drainage channels" as specified in Table 7-1. (Two of the sites are in Spray Area 3, one is in Spray Area 2, two are along the pipeline, and one is on the south end of Spray Area 1.) For these six sites, soil horizon, not one-foot composites, are appropriate.

In resolving these issues, careful consideration is needed to determine whether one-foot composites or six-inch soil horizon samples are appropriate to the data need **and** to ensure that data gaps are closed. DOE is reminded that the Surficial Soil Sampling program does not include analyses for radionuclides; therefore, the potential for infiltration of radionuclides into the soil and vadoze zone, and the need for data to address this potential, must be carefully considered as DOE revises this work plan.

Section 8.2.2: The first paragraph of page 7 states that data collected from 1989 to the present has undergone validation, whereas, the older data has not been validated. This statement implies that the data have not undergone the validation process, not that it was found to be invalid. This conflicts with a statement in Section 4.1.2.1 which indicates that the validation process for the older soil sampling data was completed and largely resulted in the rejection of soils data. It is unclear whether the data referred to in this section is non-soils data. Please rectify and amend the text as necessary.

Section 8.3.2: Regarding the first paragraph, mechanisms relevant to the WSF-OU11 include soil contaminants leaching to groundwater (and vadose water). This is significant in that vadose water may not reach ground water but may move through the vadose zone to contaminate the surface or subsurface soils, etc.

Section 8.3.5: The first paragraph states the following: "The majority of the data will be collected at the source and will be used in conjunction with a transport model to estimate expected concentrations at some exposure point" (emphasis added). Per the

IAG, Statement of Work, Section I.B.11.b, page 14, "the draft Proposed Phase I IM/IRA Decision Document shall address all hazardous substance source areas with risk levels greater than **10E-6 evaluated at the source**" (emphasis added). The reason for a Phase I RFI/RI Work Plan is to investigate the site for the purpose of closer of the source; the decision document implements the closure process. Therefore, a determination of risk at the source is appropriate. This work plan must specify that the risk assessment will be evaluated at the source. Also, the Division does not recall a commitment to an "at the source" evaluation in the preceding sections. Section 4.0, third paragraph, appears to be a suitable place to acknowledge this objective.

Section 9.2.1.1: In the second paragraph, reference is made to Appendix E of the Phase I RFI/RI Workplan. The Division assumes this refers to the appendices that accompanied the draft work plan. DOE has not, but should, resubmit the appendices as a volume to this work plan.

Section 9.2.1.4: On page 8 reference is made to OU5 and OU4. Relative to the discussion, it appears that OU-6 was the intended reference rather than OU-4.

Section 9.3.1.2: The last paragraph, page 23, suggests that while there is no history of disposal of pesticides, PCBs or dioxins there inclusion on the preliminary list of COCs is warranted "until further data indicate otherwise". Section 7.4.2 does not include provision for the analysis of TCL pesticides/PCBs. What "further data" are proposed, or should be proposed?

Section 9.4.1: On page 40, it states that the (EE) FSP is presented in Section 9.3. It is located in Section 9.5.

Section 9.5.2.1: Reference is made in the third paragraph, page 56, to SOPs. Are these also now EMD.OPS?